

APPLICATION FOR  
UNITED STATES PATENT  
IN THE NAME OF

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FOR

BICYCLE CONTROL DEVICE

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## BICYCLE CONTROL DEVICE

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### Field of the Invention

10 The present invention relates generally to bicycle control devices, and more particularly to an electric switch used to operate a bicycle computer, wherein the electrical switch is mounted in a recess defined in the bicycle control device.

### Background of the Invention

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20 Modern bicycles allow the rider to control the gears, the brakes and other features of the bicycle to optimize the rider's experience. Much of the control functions are computerized so that a rider can control the particular function by simply pressing a switch. The switch is usually provided on a computerized control panel of a bicycle. A typical computerized control panel includes a base member mounted to the bicycle handlebar and numerous switches on the control panel, each switch corresponding to a particular function that is controllable by the rider.

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30 During a ride, it is important that the rider be able to conveniently access the control switch associated with a particular function. Moreover, to retain control of the bicycle, it is desirable to provide a switch wherein the switch can be activated by the rider while allowing the rider to, simultaneously, retain a grip on the bicycle handlebar. However, while it is desirable to provide the switch close to the grip, it is not necessarily convenient

to have the computerized control panel positioned near the grip for several reasons. First, it is visually more desirable to have the control panel centered in front of the bicycle rider during a ride. Second, a computerized bicycle  
5 may already have numerous devices, such as the brake control device and shifter, already attached to the handlebar near the grip. Accordingly, there may be little room for an additional computerized control panel.

Accordingly, it is desirable to provide a control switch  
10 that is close to the grip of the handlebar so as to be easily accessible to a bicycle rider during a ride without requiring the rider to remove his or her grip from the handlebar in order to access the control switch.

It is also desirable to provide a control switch that is  
15 remote from the cycle computer such that the computer can be installed in a location that is easily viewable by the bicycle rider.

Furthermore, it is desirable to provide a simple and inexpensive method of installing the control switch.

#### Summary of the Preferred Embodiments

A bicycle control device having a switch mounting recess therein is disclosed. The bicycle control device  
25 could be a shifter, a brake control mechanism or an integrated shifting and brake control device. A control switch of a cycle computer is mountable in the switch mounting recess. The control switch is connected to a cycle computer, located remote from the control switch, by a  
30 connecting cable. The control switch can be attached in the switch mounting recess by various means, including, adhesively connecting the control switch to the switch mounting recess. In one embodiment of the invention, the

control switch is press fitted into the switch mounting recess. In another embodiment, an elastic portion of the control switch is press fitted into a hole in the switch mounting recess. The control switch can also be securely  
5 retained in the switch mounting recess by a retention ring attached to the control device.

Other objects, features and advantages of the present invention will become apparent to those skilled in the art from the following detailed description. It is to be  
10 understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the present invention, are given by way of illustration and not limitation. Many changes and modifications within the scope of the present invention may be made without departing  
15 from the spirit thereof, and the invention includes all such modifications.

#### Brief Description of the Drawings

20 The invention may be more readily understood by referring to the accompanying drawings in which:

FIG. 1a is a front plan view of a preferred embodiment of the handlebar assembly of the present invention;

25 FIG. 1b is front plan view of another embodiment of the handlebar assembly of the present invention;

FIG. 2 is a perspective view of a preferred embodiment of the control device of the present invention;

30 FIG. 3 is a side cross-sectional view of a preferred embodiment of the control switch of the present invention installed in a recess in the control device;

FIG. 4 is a side cross-sectional view of a preferred embodiment of the control switch of the present invention installed in a recess in the control device;

FIG. 5 is a side cross-sectional view of a preferred embodiment of the control switch of the present invention installed in a recess in the control device;

FIG. 6 is a side cross-sectional view of a preferred embodiment of the control switch of the present invention installed in a recess in the control device; and

FIG. 7 is a side cross-sectional view of a preferred embodiment of the control switch of the present invention installed in a recess in the control device.

Like numerals refer to like parts throughout the several views of the drawings.

#### Detailed Description of the Preferred Embodiments

An exemplary embodiment of a handlebar assembly according to the principles of the present invention is illustrated in Figures 1a and 1b and identified by reference numeral 10. The handlebar assembly 10 includes a handlebar 12 and a pair of hand grips 14 attached at the opposite ends 16, 18 of the handlebar 12. A control device 20 is preferably attachable to the handlebar at a location proximal to the hand grip 14. A control device is defined herein as a mechanism for controlling a bicycle function, such as a shifter or a brake control apparatus. The control device also includes devices that combine two or more functional controls such as a combined brake and shifting device. In the embodiment shown in Figures 1a and 1b, the control device 20 is a combined brake and shifting device. However, it is envisioned that the invention encompasses any type of control

device and is not limited to the control device listed and shown herein.

As shown in Figures 1a and 1b, in one embodiment of the present invention, the control device 20 includes a brake lever 22, a first shift lever 23 (not shown) and a second shift lever 24. The brake lever 22 controls the braking mechanism of the bicycle when activated, in a manner known in the art. The shift levers 23, 24 control the shifting mechanism of the bicycle when activated, in a manner known in the art. The brake lever 22 and shift levers 23, 24 are preferably positioned on the handlebar 12 at a location proximal the hand grip 14 such that the rider can maintain a hand on the grip 14 while using an index finger to operate the brake lever 22 or shift lever 24 or using a thumb to operate the shift lever 23.

The handlebar assembly 10 preferably includes a cycle computer 30 attached to the handlebar 12. In a preferred embodiment of the invention, the cycle computer includes a computer screen 32 positioned substantially above the center of the handlebar 12. In the embodiment shown in Figures 1a and 1b, the cycle computer 30 includes a computer bracket 34. The computer bracket 34 is attachable to the handlebar 12 and when installed maintains the cycle computer 30 in a stable, rigid position.

The cycle computer 30 is preferably operable using a control switch 40. In a preferred embodiment of the invention, the control switch 40 is positioned at a location remote from the cycle computer 30. Specifically, as shown in Figures 1a and 1b, the control switch 40 is provided on the control device 20 in a position that is conveniently accessible to the rider. In the embodiment shown in Figure 1a, the rider can maintain a grip on the hand grip 14 while using an index finger to operate a brake lever 22 or

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a shift lever 24, and using a thumb to operate a shift lever 23 or control switch 40. In another embodiment of the invention, as shown in Figure 1b, the control switch 40 is located on the control device 20 at a location that is conveniently accessible by the rider's index finger.

By providing the control switch 40 at a location remote from the cycle computer 30, the necessity of installing the computer 30 proximal to or integral with the control device 20 is eliminated. In this regard, the computer 30, and the computer screen 32, can be installed at a location that is more convenient for viewing by the rider while the control switch 40 can be installed at a location that is near the rider's hand. The control switch 40 is electrically connected to the computer 30 by the connecting cable 36. The connecting cable has one end attached to the control switch and the other end attached to the computer, such that by activation of the control switch 40, the rider activates a computer operation by the cycle computer 30. In another embodiment of the invention, the control switch 40 and the cycle computer 30 are in electrical communication via a remote wireless connection, known in the art.

As shown in Figure 2, the control device 20 of the present invention is provided with a switch mounting recess 42. In a preferred embodiment of the invention, the switch mounting recess 42 is a bottomed hole for inserting and securing the control switch 40. The switch mounting recess 42 has the same shape as the control switch 40 and is configured to closely fit the control switch 40. In a preferred embodiment of the invention, the switch mounting recess 42 is dimensioned such that when the control switch 40 is installed, the control switch 40 is flush with the surface of the control device 44, shown in Figure 2.

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The control device 20 preferably includes a cable mounting recess 50 therein dimensioned to receive a portion of the connecting cable 36 which connects the control switch 40 to the cycle computer 30. The cable mounting recess 50 preferably has an end 52 connected to the switch mounting recess 42 and extends on the surface of the control device 44 in the direction of the cycle computer 30. In a preferred embodiment of the invention, when the connecting cable 36 is mounted in the cable mounting recess 50, the connecting cable 36 is flush with the surface 44 of the control device 20. The cable mounting recess 50 preferably retains a portion of the connecting cable 36 securely therein and prevents it from movement.

Figures 3 through 7 depict various means of installing the control switch 40 in the switch mounting recess 42 of the control device 20. As shown in Figure 3, in one embodiment of the invention, the control switch 40 is attached to the switch mounting recess 42 by a double-sided adhesive tape or other adhesive. In the embodiment shown in Figure 3, an adhesive layer 60 is positioned between the bottom surface 46 of the switch mounting recess and the control switch 40.

In the embodiment shown in Figure 4, the control switch 40 includes an outer casing 48 comprised of elastic material. The outer diameter or width of the control switch 40 is preferably larger than the inner diameter or width of the switch mounting recess 42. The control switch 40 is press fit into the switch mounting recess 42 such that the control switch is securely maintained in the switch mounting recess.

In the embodiment shown in Figure 5, the control switch 40 includes an attachment arm 62 protruding from the bottom thereof. The attachment arm 62 is preferably comprised of



an elastic material and press fit into a hole 64 at the bottom 46 of the switch mounting recess 42. In a more preferred embodiment, the outer casing 48 of the control switch 40 and the attachment arm are integrally attached and both comprise of an elastic material.

In the embodiment shown in Figure 6, the outer casing 48 of the control switch 40 includes a shoulder 66. To secure the control switch 40 in the switch mounting recess 42, a retention ring 68 is secured to the top surface 44 of the control device 20 surrounding the control switch 40. The retention ring 68 is dimensioned to restrict the movement of the shoulder 66 such that the shoulder 66 is not able to move outside of the switch mounting recess 42. The retention ring 68 is preferably attached the top surface 44 of the control device 20 by a fastener 70. In the embodiment shown in Figure 6, fastener 70 is a pair of screws, however, any known fasteners can be used.

In the embodiment shown in Figure 7, the retention ring 68 is threadingly engaged to the inside diameter 72 of the switch mounting recess 42. The retention ring 68 is positioned proximal the control switch 40 and dimensioned to restrict the motion of the control switch 40. In a preferred embodiment, the retention ring is configured to allow a rider to access and activate the control switch 40 while securely holding the shoulder 66 of the switch in place.

In a preferred embodiment of the invention, the control switch 40 is detachable from the switch mounting recess 42. A detachable switch enables the user to purchase the control device separately from the bicycle computer and switch assembly. Furthermore, if the switch requires repair or maintenance, the switch can be removed without removing the control device entirely.

The embodiments described above are exemplary embodiments of a bicycle control device having a switch mounting recess therein. Those skilled in the art may now make numerous uses of, and departures from, the above-described embodiments without departing from the inventive concepts disclosed herein. Accordingly, the present invention is to be defined solely by the scope of the following claims.

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